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WHITE PINE BLISTER RUST CONTROL

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The first instance of agricultural extension activities applied in a large way to a specific forestry problem is found in the present organization of white pine blister rust control work. Experimental work has demonstrated, during the past seven years, that white pine woodlots can be effectively protected from this disease at very reasonable cost. The blister rust has spread throughout the important white pine regions of the Northeastern States, is advancing rapidly in the Lake States, and recently has been found in the far West.

Eradication of the disease is now definitely known to be impossible. The production of white pine lumber will continue, however, because it is practicable to protect individual white pine tracts from the ravages of the rust. This is accomplished by uprooting all wild and cultivated currant and gooseberry bushes (the carriers of the disease) found within 900 feet of the pines. During the past field season, 473,000 acres in the Eastern States have been cleared of these bushes at a cost of less than 20¢ per acre. The white pine growing on this area is safe from the blister rust for the next 5 to 10 years, when the land must be covered again. Spraying has no appreciable effect on the rust and is impracticable in the woods. However, so far as cost and effort is concerned, blister rust control is no more difficult nor expensive than control of the potatoe bug or apple scald. The chief requirement is that the work be done systematically at the right time and according to simple rules.

White pine blister rust is one of the many destructive pests from foreign shores that has come here to stay. Each one of these pests brings added difficulties for the farmer, horticulturist, or forester, and increased living costs to all. The blister rust was brought here on white pine seedlings imported from Europe and set out in several hundred forest plantations in the United States and Canada. Had the Federal and Dominion quarantines now in effect against imported nursery stock been in existence two or three decades earlier, it would almost

certainly have prevented the introduction of the blister rust, chestnut blight, citrus canker, Japanese beetle, and other imported pests we now have to combat.

The blister rust is caused by a parasitic fungus which grows in the bark of the white pine tree. The fungus first attacks the needles or young twigs and gradually advances from year to year until it enters the trunk and kills the entire tree regardless of its size. Its action is very much like that of the chestnut blight, except that it does not pass directly from tree to tree. A diseased pine tree produces great quantities of dry, pollen-like spores that retain their germinating power over many days, and are carried long distances by the wind. These spores are harmless to other pine trees, but when they fall on currant or gooseberry plants they produce rust infection on the lower surface of the leaves.

Currants and gooseberries act as intermediate hosts or relay stations for the blister rust, similar to common barberry plants in the spread of black stem rust of wheat. The blister rust spreads from leaf to leaf and bush to bush on the currants and gooseberries throughout the growing season, and generates a different form of spore. This spore is also carried by the wind, is harmless to currant and gooseberry plants, but produces blister rust infection on white pine trees. Unlike the spores produced by the pine trees, however, the spores that carry the disease back to the pine from the currant bushes are extremely delicate and short lived. In experiments conducted over a period of five years, none of these spores have been found which retained their life longer than eight minutes from the time they were removed from the currant leaf. It is therefore clear that these spores cannot infect pine trees at any great distance from the diseased currant bushes, and that the pines are safe if there are no currants or gooseberries near by.

Local control of the blister rust has proved effective in the Eastern United States if all currant and gooseberry bushes, wild or cultivated are destroyed within 900 feet of the pine stands. Cultivated black currant plants are dangerous to white pines growing within a mile of them. This particular variety of currants is highly susceptible to blister rust infection, and acts as a center from which the disease spreads with great momentum. For this reason, cultivated black currant is a public nuisance, and should be outlawed, like the common barberry bush.

The blister rust was found in British Columbia and Washington about a year ago, and the problem there has not been worked out to the point where we can say definitely that local control will be feasible under Western conditions. Preliminary experiments indicate that this can be done as successfully as in the East, but at somewhat greater cost per acre. In the Eastern United States there is no longer a doubt that the disease will be controlled throughout the greater part of the white pine area, but pine owners must act without delay. Extensive strip lines surveys show that about 20% of the white pines in Northeastern New York and about 7% of the white pine of Maine and New Hampshire are attacked by blister rust in areas where currant and gooseberry bushes are still present.

Practically every owner of white pine growth appreciates its value and desires to protect it. It is too late to save a tree after it is attacked by the rust, except in the case of highly valuable ornamental pines which justify the expense of culling out the blister rust cankers. In order to accomplish control on a large scale the Bureau of Plant Industry now has fifty blister rust control agents headquartered with the County Agricultural Extension Agents in counties where white pine is an important part of the farm woodlots. These agents visit the pine owners, show them the disease, and explain the action necessary to protect the pine. The agents also carry on general educational work along this line through meetings and

demonstrations, in cooperation with the Agricultural Extension Agents. Pine owners are encouraged to become local leaders in forestry projects. This work has the active support of the State and Federal agricultural extension services, and of the State Forestry Departments, under an agreement by which the State furnishes supervision of the control work done by the pine owners. This plan insures effective work. The state also uses its legal authority to remove currants and gooseberries from lands within the limits of control areas where necessary. The work is usually organized on a community basis, and land owners who have currants but no pines seldom fail to cooperate with their neighbors, because the pine is regarded as a community asset.

The Federal blister rust control program in the East has a definite time limit of eight years in which to secure protection of the pine lands in the co-operating States. It also provides that the money spent by the Bureau of Plant Industry in the maintenance of the Blister Rust Educational Agents shall be met, dollar for dollar by State funds used in assisting the pine owners to do thorough and effective work in eradicating currants and gooseberries. In 1922 under the new plan of work, the area cleared of currants and gooseberries was 22 percent greater than in 1921, and the money spent by towns and individuals for control work increased from \$19,000 in 1921 to more than \$45,000 in 1922.

An important result of the extension plan of blister rust control work is an increased interest in better woodlot management on the part of the farm owner. The success of agricultural extension work is based on the interest of the farmer being converted into action through visual demonstration and local leadership.

Woodlot management is a matter in which the farmer is becoming more and more interested because of the rapidly increasing stumpage values and the opportunity for substantial returns from land of small agricultural value. A good woodlot is a profitable farm asset. In the northeastern States, white pine yields returns of \$5 to \$10 per acre per year. It grows rapidly on sandy, rocky or worn out soils. It can be cut for box boards when forty years of age and the yields are high. A white pine woodlot is the farmers' savings bank. There are many farmers in New England today to whom this asset has provided a college education for the children and a comfortable old age for themselves. Therefore, the Blister Rust Agent meets with a ready response. The emergency of the blister rust situation requires the agent to concentrate his efforts on control of the disease, but the effect is a stimulated public interest in general forestry. The demand from woodlot owners for specific information on woodlot management has led several County Farm Bureaus to consider the employment of County Forestry Extension Agents.

There is an economic pressure behind the forestry movement today greater than ever before. The demand for lumber in the eastern States is far in excess of what these States can supply locally. The fact that the freight bill on lumber imported into New York State is about 35 million dollars annually, means that more land in this State will be planted to trees, and the existing forest growth will be given better care. In this movement, white pine has an important function, since white pine is the best species for reforestation purposes on a large part of our present nonproductive land from Maine to Minnesota. The present timber shortage will be relieved only through aroused public interest in forest re-growth, and in white pine we find the tree admirably adapted to stimulate such interest.

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February 27, 1923.

